Monday, 10/23/2006 12:04:39 PM Kim Johnston User: **Process Sheet** : HIGH AFT X-TUBE 412 : CU-LAR001 Dart Helicopters Services **Drawing Name** Customer Job Number : 29104 : 10559 **Estimate Number** : N/A : D412664203 Part Number P.O. Number S.O. No. : NA : D412-664-243 REV B **Drawing Number** : 10/23/2 706 This Issue : N/A **Project Number** Prsht Rev. : NC NIA : B : LANDING GEAR **Drawing Revision** Type First Issue :NA : 28361 Material **Previous Run** Each : 11/22/2006 Qty: **Due Date** 1 Um: Written By Checked & Approved By Reformat: Added D3189-1 K/DS Comment Est Rev:E Remove Coments on Pick List JLM Est Rev:F 06-03-29 **Additional Product** Job Number: Description: Seq. #: Machine Or Operation: DOCUMENT CONTROL 1.0 DC Comment: DOCUMENT CONTROL Photocopy bluefile and create labels as per PPP D412-664-203 CHG 003 Crosstube Material 2.0 D6009129 Comment: Qty.: 1.0000 Each(s) 1.0000 Each(s)/Unit Total: Pick: Qty Part number Description Batch 1 D6009-129 Crosstube <u>76548</u> Check OD = 3.500"; ID = 2.250" BG 66.11.10 MORI SEIKI CNC LATHE LARGE MORI SEIKI 3.0 Comment: MORI SEIKI CNC LATHE LARGE 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA166 2-Turn first side as per Folio FA166 3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243. [18] INSPECT ALL DIM TO DIM SHEET 4.0 QC1 MS own Comment: INSPECT ALL DIM TO DIM SHEET

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Monday, 10/23/2006 12:04:39 PM Date: Kim Johnston User: **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 29104 Job Number: Description: Seq. #: Machine Or Operation: MORI SEIKI CNC LATHE LARGE MORI SEIKI 5.0 Comment: MORI SEIKI CNC LATHE LARGE 1-Turn second side as per Folio FA166 2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243. 07/01/04 · ml 06/11/12 3-Polish entire outside surface of crosstube 4- Remove sand and plugs Inside of Cuff(Donot 5-Scribe part # and batch # using vibrating stylus as per Dwg D412-664-243 engrave on outside of tube) INSPECT ALL DIM TO DIM SHEET 6.0 QC1 Comment: INSPECT ALL DIM TO DIM SHEET SECOND CHECK 7.0 Comment: SECOND CHECK HAND FINISHING RESOURCE #1 8.0 HAND FINISHING1 Comment: HAND FINISHING RESOURCE-#1 Chemical Conversion Coat as per QSI 005 4.1 INSPECT WORK/WING WAŁK QC3/5 9.0 Comment: Inspect work & Chemical conversion Coat BENDING MACHINE BENDING Comment: BENDING MACHINE -11-11 Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010 DIMENSIONAL CHECK 11.0 QC6 Comment: DIMENSIONAL CHECK Form: rprocess Page 2

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Monday, 10/23/2006 12:04:39 PM Date: Kim Johnston User: **Process Shee** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 29104 Job Number: Description: Seq. #: **Machine Or Operation:** LANDING GEAR RESOURCE 1 LANDING GEAR 1 12.0 Comment: LANDING GEAR RESOURCE 1 1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 A04-01-11 2-Ream hole to finish size in tube as per Dwg D412-664-243using drill Jig DT8550 & DT8551.Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes. 3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243 07-01-20 HAND FINISHING RESOURCE #1 13.0. HAND FINISHING1 Comment: HAND FINISHING RESOURCE #1 Chemical Conversion Coat as per QSI 005 4.1 INSPECT POWDER COAT/CHEMICAL CONVERSION 14.0 QC3 POWDER COAT/CHEMICAL CONVERSION Comment: INSPEC INSPECT WORK TO CURRENT STEP QC5 15.0 Comment: INSPECT WORK TO CURRENT STEP **OUTSIDE SERVICES** 16.0 Comment: Sub-Contracting OUTSIDE SERVICES Liquid Penetrant Inspection as per QSI 038Or C/07/01/230 Issue P/O: 29/5 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order PACKAGING RESOURCE #1 17.0 Comment: PACKAGING RESOURCE #1 Inspect for transit damage  $_{t\in [L]}(t) = 0$ Ensure copy of NDT results attached to work order.

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Part No: PAR #: Fault Category: NCR: Yes No DQA: Date: QA: N/C Closed: Date: NCR: VORK ORDER NON-CONFORMANCE (NCR)	W/O:	·.		V	<b>NORK ORDER CI</b>	HANGES				· · · · · · · · · · · · · · · · · · ·	
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Monday, 10/23/2006 12:04:40 PM Date: Kim Johnston User: **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 29104 Job Number: Seq. #: **Machine Or Operation:** Description: INSPECT WORK TO CURRENT STEP 18.0 Comment: Inspect for damage & ensure results are as per Dwg D412-664-203 SPRAY PAINTING 19.0 Comment: SPRAY PAINTING 1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 QC14 Inspect Spray Paint 20.0 Comment: Inspect Spray Paint Wrap in plastic bag to protect from scratches Abrasion Strip 21.0 1.7640 f(s)/Unit Total: 1.7640 f(s) Comment: Qty.: Pick: Qty Part number Description 2 D2856-600(Cut to 10.090") Abrasion Strip 3266 50 Batch 4 07-02-13 D2856600 22.0 5 1.0080 f(s) Comment: Qty... 1\_0080 f(s)/Unit Total: Pick: Qty Part number Description 1 D2856-600(Cut to 10.870") Abrasion Strip D28961 1.0000 Each(s)/Unit Total: 1.0000 Each(s) Comment: Qty.: Pick: AT 07-02-22 Description Batch Qty Part number Support 29707 1 D2896-1

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Monday, 10/23/2006 12:04:40 PM Date: Kim Johnston User: • **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Job Number: 29104 Part Number: D412664203 Job Number: Description: **Machine Or Operation:** Seq. #: Chafing Shield 24.0 D31891 2.0000 Each(s)/Unit Total: 2.0000 Each(s) Comment: Qty.: Pick: Qty Part number Description Batch Chafing Sheild 327 444 2 D3189-1 MS2192028 Comment: Qty.: 4.0000 Each(s) 4.0000 Each(s)/Unit Total: Pick: Description Batch\_ Qty Part number Clamp/10/t34 4 MS21920-28 clamp(per MIL-DTL-8783C) 26.0 MS2192030 Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s) Qty Part number Description Batch M (0293) Clamp Acoustic 2 MS21920-3 LANDING GEAR 1 LANDING GEAR RESOURCE 1 Comment: LANDING GEAR RESOURCE 1 25/R 07-02-216 Assemble as per Dwg D412-664-203 INSPECT WORK TO CURRENT STEP 28.0 QC5 Comment: INSPECT WORK TO CURRENT STEP PACKAGING RESOURCE #1 PACKAGING 1 29.0 Comment: PACKAGING RESOURCE #1 Pick Packing Kit Bolt 30.0 AN640A Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s) Bolt

W/O:			WC	RK ORDER CHANG	ES				
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Date: Monday, 10/23/2006 12:04:40 PM User: Kim Johnston **Process Sheet** Drawing Name: HIGH AFT X-TUBE 412 Customer: CU-DAR001 Dart Helicopters Services Part Number: D412664203 Job Number: 29104 Job Number: Description: Seq. #: **Machine Or Operation:** Bolt 31.0 AN641A 2.0000 Each(s) Comment: Qty.: Total: 2.0000 Each(s)/Unit Bolt Batch: Washer AN960JD616 32.0 18.0000 Each(s) Comment: Qty.: 18.0000 Each(s)/Unit Total: Washer Batch: Nut MS21042L6 33.0 6.0000 Each(s) Comment: Qty.: 6.0000 Each(s)/Unit Total: Nut Batch: INSPECT 100% KITS 34.0 QC4 Comment: INSPECT 100% KITS FOR COMPLETENESS PACKAGING RESOURCE # **PACKAGING** 35.0 Comment: PACKAGING RESOURCE #1 Identify and pack for shipping as per PPP D412-664-203 Location: PPP Rev: 36.0 QC21 Comment: FINAL INSPECTION/W/O RELEASE U Bqu228 Job Completion

W/O:			WORK ORDER CHANGES										
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DART AEROSPACE LTD	Work Order:	29104
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: B		Page 1 of 1

## FIRST ARTICLE INSPECTION CHECKLIST

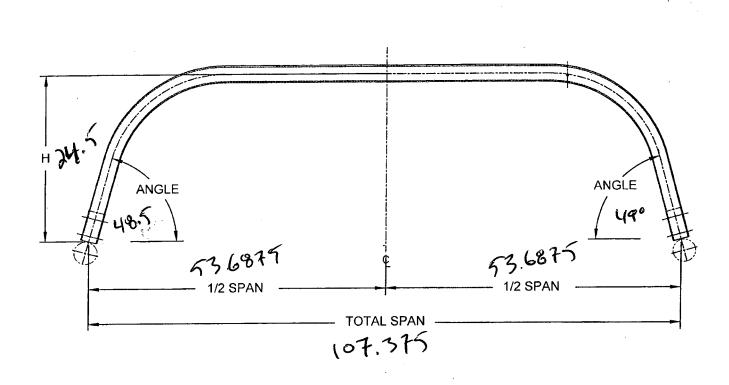
X First Article Prototype

	spection Sheet	_	Actual		<b>D</b> : 4	Method of	Comments
Dra	wing Dimension	Tolerance	Dimension	Accept	Reject	Inspection	Comments
	2.684	+0.005/-0.000	2.687				
	2.748	+0.005/-0.000	2.751				
	2.884	+0.005/-0.000	2.337				
	3.019	+0.005/-0.000	3.021				
	3.163	+0.005/-0.000	3.164				
	3.308	+0.005/-0.000	3.309				
<	3.429	+0.005/-0.000	3,429				
SIDE	2.990	+0.005/-0.000	2.993				
S	2.618	+0.005/-0.000	2.622				
	0.200	+/-0.010	0.210				
	R0.063	+/-0.010	B.063				
	R0.500	+/-0.010	0.500				
	4.971	+/-0.001	4.921				
		'		-			
	2.684	+0.005/-0.000	2.688				
	2.748	+0.005/-0.000	2.753				
	2.884	+0.005/-0.000	2.889				
	3.019	+0.005/-0.000	3.024				
	3.163	+0.005/-0.000	3.167				
	3.308	+0.005/-0.000	3.308				
m	3.429	+0.005/-0.000	3,429				
	2.990	+0.005/-0.000	2.993				
SIDE	2.618	+0.005/-0.000	2.423	)			_
	0.200	+/-0.010	0.205				
	R0.063	+/-0.010	RO.063				
	R0.500	+/-0.010	R 6.500				
	4.971	+/-0.001	4.971		-		
	124.09	+/-0.020	124.100				

Measured by:	2n D	Audited by: SO	Prototype Approval:	N/A
Date:	0////12	Date: 06. 12., 27	Date:	N/A

Rev	Date	Change	Revised by	Approved
Α	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	1
В	06.03.09	Dwg Rev updated	KJ/JLM 🔏	GH

#### **Crosstube Bend Dimension Sheet**



PART NUMBER: 0412 664-203

BATCH NUMBER: 29104

DRAWING: 412664-243 REVISION: B

н: 24.37

1/2 SPAN: \_53.72

TOTAL SPAN: 107.44

ANGLE: 50°

QC 15: \_\_

DATE: 07-01-11





	DESIGN PH		DRAWN BY	Ή	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA			
ı	CHECK	(ED		APPROVED		DRAWING NO.		REV. B
ı		<	#			D412-664-243	SHEET	1 OF 3
Ì	DATE					TITLE		SCALE
	05.0	2.0	4			CROSSTUBE ASSEMBLY (412 HI	AFT)	NTS
	Α			01.10.1	7	NEW ISSUE		
	В			05.02.0	4	ADD HOLES FOR COMPATABIL WITH BHT/AA SKIDTUBES	ITY	

SHOP COPY RETURN TO

ENGINEERING UNCONTROLLED COPY

SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER



		•
Qty	Part Number	Description
X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
	D-12-00-2-0	CACCOTOBE ACCEMBET (TIETHOTTALL)
1	D6009-129	CROSSTUBE
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
1	D2856-600-1087	ABRASION STRIP
4	MS21920-28	CLAMP
2.	MS21920-30	CLAMP
2	D3189-1	CHAFING SHIELD

#### **GENERAL NOTES:**

TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.

MATERIAL: MANUFACTURED FROM D6009-129 2)

FINISHED LENGTH =  $124.09\pm0.020$ 

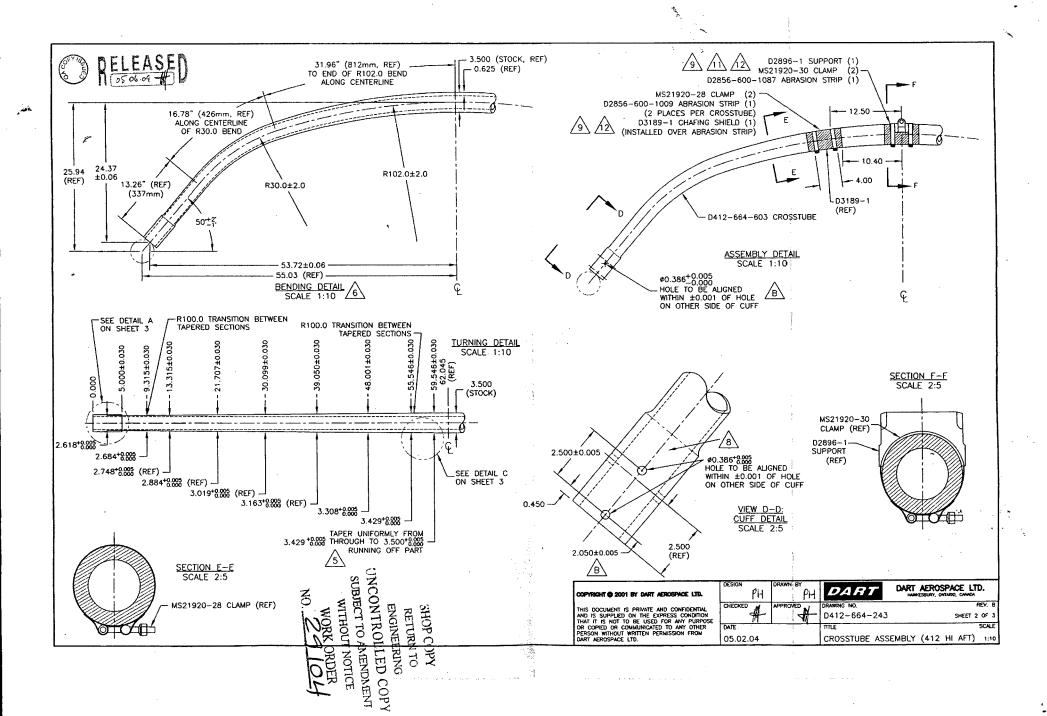
FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2 PAINT OUTSIDE PER DART 005 4.2

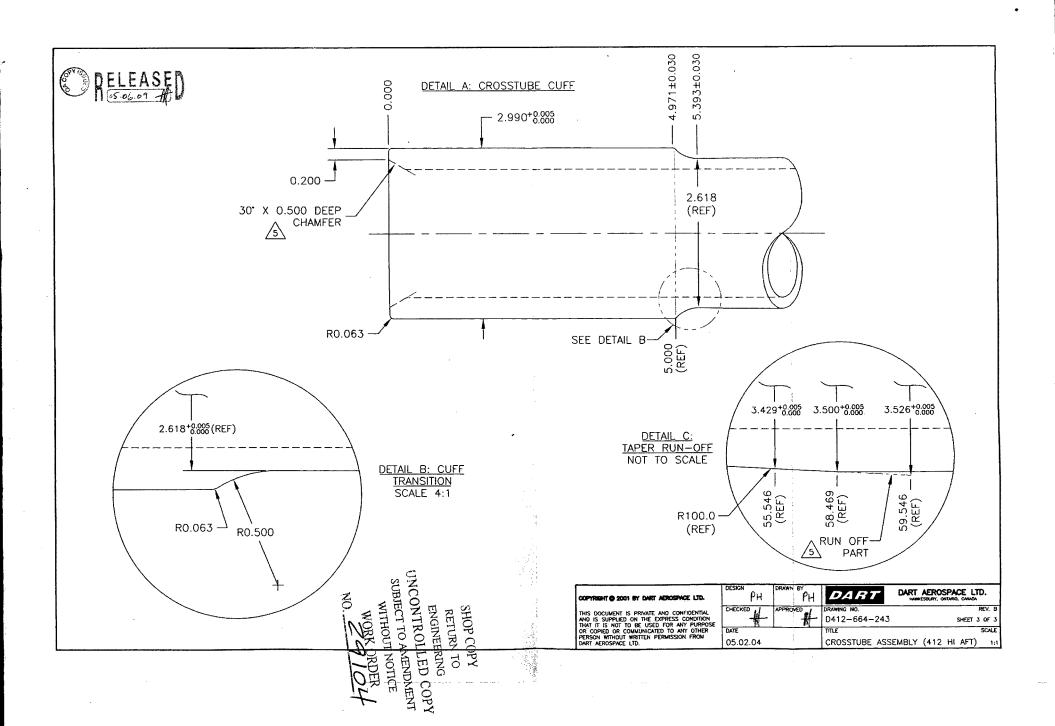
PART IS SYMMETRIC ABOUT CENTERLINE.

- RUN-OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH. 5)
- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- INSTALL D2856-600-1009 AND D2856-600-1087 ABRASION STRIPS WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D2896-1 SUPPORT, PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  $\sim$ OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY, CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) IT IS OPTINAL TO TO SEAL EDGES OF SUPPORTS USING SIKAFLEX-241/291 SEALANT.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB.

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W.O. Nº 35629

A.M.O. Number: 46/90

# NON-DESTRUCTIVE TESTING

	220111001141	L LESTING REPUR	
	AIRCRAFT / COMPON	VENT INFORMATION	
REGISTRATION:	MODEL/TYPE:	SERIAL NUMBER:	

	AIRCRAFT / CO	MPONENT INFORM	ATION				
REGISTRATION:	MODEL/TYPE:		SERIAL NUMBER:				
TOTAL HR/LDG:	OPERATED BY:	_	BASED AT:				
Qty (1) P/N D212-664 Qty (3) P/N D212-664	ross tube (external surf t client) - parts delivere -101 S/N B27987 -201 S/N's B27989 F	329506 & B29531 330187, B30188, B2726	F17-05 and the Dart QSI 038,				
Note: A Level 3 penetr Ardrox 970P25E Two (2) cross tubes (P/I B29506 & B29531). To	Fluorescent penetrant inspection was performed in accordance with the above requirements on (10) cross tubes.  Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive)  Ardrox 970P25E Batch #04B503.  Two (2) cross tubes (P/N D212-664-201) FAILED inspection. Areas marked on cross tubes (S/N's B29506 & B29531). To be reinspected following repair.  Eight (8) cross tubes PASSED inspection.						
THE MAINTENANCE DES THE A INSPECTED BY:	SCRIBED ABOVE HAS BEEN PERFORM PPLICABLE STANDARDS OF AIRWORT	ED IN ACCORDANCE WITH HINESS	DATE January 23, 2007 INSPECTION Not Required				
CUSTOMER: Dart Aerospace ADDRESS:	CUSTOM	ER INFORMATION	P.O. NUMBER 2915  CONTACT NAME:				
ABOUR @  MATERIALS @			\$				
RAVEL EXPENSES @			GST				
HOTEL EXPENSES @			PST				
wн	INVOICE NO.  ITE COPY - INSPECTION FILE • YELLO	DW COPY – CUSTOMER • PINK COPY –	TOTAL \$				